THE SCIENCE OF ENERGY BALANCE: CALORIE INTAKE AND PHYSICAL ACTIVITY

Washington, D.C. Science Learning Standards: Grades 6, 7, 8

Grade 6

Lesson	Standard	Description
1, 3, 4	6.1.1	Give examples of different ways scientists investigate natural phenomena and identify processes all scientists use, such as collection of relevant evidence, the use of reasoning, the development and testing of hypotheses, and the use and construction of theory in order to make sense of the evidence.
1, 2, 3, 4	6.1.2	Plan and conduct simple investigations based on student-developed questions that pertain to the content under study, and write instructions others can follow in carrying out the investigations.
1, 3, 4	6.1.3	Identify dependent and independent variables in those investigations that have controls. And, if no controls are used, explain why.
1, 3, 4	6.1.4	Recognize and explain that hypotheses are valuable even if they turn out not to be true, but that many investigations are not hypothesis driven.
1, 3, 4	6.1.5	Write a report of an investigation that includes the problem to be solved, the methods employed, the tests conducted, the data collected or evidence examined, and the conclusions drawn.
1, 3, 4	6.1.6	Locate information in reference books, back issues of newspapers and magazines, CD-ROMs, and online databases.
All lessons	6.1.7	Draw conclusions based on scientific evidence, and indicate whether further information is needed to support a specific conclusion or to discriminate among several possible conclusions.
All lessons	6.1.8	Record and organize information in simple tables and graphs, and identify relationships they reveal. Use tables and graphs as examples of evidence for explanations when writing essays or writing about lab work, fieldwork, etc. Read simple tables and graphs produced by others, and describe in words what they show.
1, 4	6.2.1	Explain that computers have become valuable in science because they speed up and extend people's ability to collect, store, compile, and analyze data, prepare research reports, and share data and ideas with investigators all over the world.
1, 3, 4	6.2.2	Explain that technology is essential to science for such purposes as measurement, data collection, graphing and storage, computation, communication of information, and access to outer space and other remote locations.

Grade 7

Lesson	Standard	Description
1, 3, 4	7.1.1	Explain that when similar investigations give different results, further studies may help to show whether the differences are significant.
1, 3, 4	7.1.2	Explain why it is important in science to keep honest, clear, and accurate records.

4	**7.1.3**	Explain why research involving human subjects requires that potential subjects be fully informed about the risks and benefits associated with the research and that they have the right to refuse to participate.
1, 2, 3, 4	**7.1.4**	Recognize testable hypotheses in investigations that pertain to the content under study, and write instructions others can follow in carrying out the investigation.
1, 3, 4	**7.1.5**	Communicate the steps and results from an investigation in written reports and verbal presentations.
1, 3, 4	**7.1.6**	Incorporate circle charts, bar and line graphs, diagrams, scatter plots, and symbols into writing, such as lab or research reports, to serve as visual displays of evidence for claims and/or conclusions.
1, 3, 4	**7.1.7**	Recognize whether evidence is consistent with a proposed explanation, and know that different explanations can be given for the same evidence and that partial evidence may be exploited for reasons other than truth seeking.
5	**7.2.2**	Know how technologies having to do with food production, sanitation, and disease prevention have dramatically changed how people live and work and have resulted in changes in factors that affect the growth of human population.
All lessons	**7.7.3**	Explain how the amount of food energy (usually measured in Calories) that a person requires varies with body weight, age, sex, activity level, and metabolic rate.
4, 5	**7.7.4**	Research and explain that regular exercise is important to maintain a healthy heart/lung (cardiovascular) system, good muscle tone, and strong bone structure.
Grade 8		
Lesson	**Standard**	**Description**
3, 4	**8.1.1**	Describe how scientific knowledge is subject to modification and refinement as new information challenges prevailing theories.
1, 3, 4	**8.1.2**	Test hypotheses that pertain to the content under study.
1, 3, 4	**8.1.3**	Describe how if more than one variable changes at the same time in an experiment, the outcome of the experiment may not be attributable to a change in any single variable.
1, 3	**8.1.4**	Explain why accuracy and openness in record keeping and replication are essential for maintaining an investigator's credibility with other scientists and society.
1, 3, 4	**8.1.5**	Write clear step-by-step instructions (procedural summaries) for conducting investigations.
All lessons	**8.1.6**	Participate in group discussions on scientific topics by restating or summarizing accurately what others have said, asking for clarification or elaboration, and expressing alternative positions.
1, 2, 3, 4	**8.1.7**	Use tables, charts, and graphs in making arguments and claims in presentations about lab work.
1, 3, 4	**8.1.9**	Explain why arguments may be invalid if based on very small samples of data, biased samples, or experiments in which there was no control sample.
All lessons	**8.1.12**	Apply simple mathematical models to problems (e.g., formulas such as $F = ma$).
2, 3, 4, 5	**8.5.4**	Recognize and describe that energy is a property of many systems and can take the forms of mechanical motion, gravitational energy, the energy of electrostatic and magnetostatic fields, sound, heat, light (electromagnetic field

		energy).
2, 3, 4, 5	**8.5.10**	Investigate and explain that in processes at the scale of atomic size or greater, energy cannot be created or destroyed but only changed from one form into another.

Washington, D.C. Mathematics Learning Standards: Grades 6, 7, 8

Grade 6

Lesson	Standard	Description
1, 2, 3, 4	**6.NSO-N.1**	Explain the properties of and compute with rational numbers, expressed in a variety of forms.
2	**6.NSO-N.5**	Identify and determine common equivalent fractions, mixed numbers, decimals, and percentages.
1, 2, 3, 4	**6.NSO-C.8**	Select and use appropriate operations to solve problems involving addition, subtraction, multiplication, division, and positive integer exponents with whole numbers and with positive fractions, mixed numbers, decimals, and percentages.
1, 2, 3, 4	**6.NSO-C.10**	Accurately and efficiently add, subtract, multiply, and divide (with multidigit divisors) whole numbers and positive decimals.
2, 3, 4	**6.NSO-C.14**	Solve simple proportion problems using such methods as unit rate, scaling, finding equivalent fractions, and solving the proportion equation a/b = c/d.
1, 2, 3, 4	**6.PRA.2**	Write and solve one-step linear equations and check the answers.
1, 2, 4	**6.PRA.8**	Recognize when information given in a table, graph, or formula suggests a proportional or linear relationship.
1, 4	**6.PRA.9**	Produce and interpret graphs that represent the relationship between two variables (*x* and *y*) in everyday situations.

Grade 7

Lesson	Standard	Description
1, 2, 3, 4	**7.NSO-C.11**	Demonstrate an understanding of the properties of arithmetic operations on rational numbers (integers, fractions, and terminating decimals); convert terminating decimals into reduced fractions.
1, 2, 3, 4	**7.NSO-C.12**	Select and use appropriate operations — addition, subtraction, multiplication, division — to solve problems with rational numbers and negative integers.
3	**7.NSO-C.13**	Calculate the percentage increase and decrease of a quantity.
4	**7.PRA.1**	Extend, represent, analyze, and generalize a variety of patterns with tables, graphs, words, and, when possible, symbolic expressions. Include arithmetic and geometric progressions (e.g., compounding).
2	**7.M.1**	Select, convert (between systems of measurement), and use appropriate units of measurement or scale.
2, 3, 4	**7.M.5**	Use ratio and proportion, including scale factors, in the solution of problems.
1, 2, 3, 4	**7.DASP.2**	Select, create, interpret, and use various tabular and graphical representations of data (e.g., circle graphs, Venn diagrams, stem-and-leaf plots, histograms, tables, and charts).

1, 3, 4	**7.DASP.3**	Describe the characteristics and limitations of a data sample. Identify different ways of selecting a sample (e.g., convenience sampling, responses to a survey, random sampling).
Grade 8		
Lesson	**Standard**	**Description**
1, 2, 3, 4	**8.NSO-N.1**	Explain the properties of and compute with real numbers expressed in a variety of forms.
1, 2, 3, 4	**8.NSO-C.15**	Select and use appropriate operations — addition, subtraction, multiplication, division, and positive integer exponents — to solve problems with rational numbers, including negative rationales.
1, 4	**8.PRA.1**	Use tables and graphs to represent and compare linear growth patterns. In particular, compare rates of change and *x*- and *y*-intercepts of different linear patterns.
1, 4	**8.PRA.8**	Explain and analyze — both quantitatively and qualitatively, using pictures, graphs, charts, and equations — how a change in one variable results in a change in another variable in functional relationships.
1, 2, 3, 4	**8.DASP.2**	Select, create, interpret, and use various tabular and graphical representations of data (e.g., scatterplots, box-and-whisker plots).
1, 4, 5	**8.DASP.3**	Recognize practices of collecting and displaying data that may bias the presentation or analysis.
Washington, D.C. Reading / English Language Arts Learning Standards: Grades 6, 7, 8		
Grade 6		
Lesson	**Standard**	**Description**
1, 2, 3, 4	**6.LD-D.1**	Apply understanding of agreed-upon rules and individual roles to make decisions, including eliciting and considering suggestions from each group member, defining individuals' roles and responsibilities, and coming to consensus.
All lessons	**6.LD-Q.4**	Restate and execute multistep oral instructions and directions.
1, 2, 3, 4	**6.LD-V.8**	Use such clues as definition, example, and restatement to determine the meanings of unfamiliar words and words with multiple meanings in context.
All lessons	**6.IT-A.6**	Recognize arguments for and against an issue.
1, 3, 4	**6.W-E.2**	Write explanations of a process that: group ideas and place them in logical order and include details to ensure the process is understandable.
1, 3, 4	**6.W-E.3**	Write research reports that: frame a key question about an issue or situation, group ideas and place them in logical order, and include facts and details that illuminate the main ideas.
5	**6.W-E.4**	Write persuasive essays that support a position with organized and relevant evidence.
1, 3, 4, 5	**6.EL.6**	Spell frequently misspelled words correctly according to usage (e.g., *their, they're, there*).
Grade 7		
Lesson	**Standard**	**Description**

1, 2, 3, 4	**7.LD-D.1**	Know and apply rules for formal and informal discussions, including planning agendas, setting time limits for speakers, and taking votes on key issues.
1, 2, 3, 4	**7.LD-Q.2**	Ask probing questions to elicit information, including questions about the evidence that supports the speaker's claims and conclusions.
1, 2, 3, 4	**7.LD-V.8**	Use such clues as cause and effect and comparison and contrast to identify the meaning of unfamiliar words and words with multiple meanings in context.
1, 2, 3, 4	**7.IT-DP.4**	Respond appropriately to a set of instructions and complete a task.
1, 2, 3, 4	**7.IT-DP.5**	Determine what information (e.g., steps in directions, legend, supplies needed, illustrations, diagram, sequence) is missing or extraneous in document and procedural text.
1, 3, 4, 5	**7.R.1**	Apply steps for obtaining information from a variety of sources, organizing information, documenting sources, and presenting research in individual and group projects.
3, 4	**7.W-E.2**	Write summaries of passages that: group related ideas and place them in logical order, contain main ideas and significant details of the passage, and reflect the underlying meaning of the source.
5	**7.W-E.4**	Write persuasive essays that: state a clear position or perspective in support of a proposition or proposal, and provide evidence in support of the proposition.
Grade 8		
Lesson	**Standard**	**Description**
1, 2, 3, 4	**8.LD-D.1**	Identify techniques to improve productivity of group discussions, including setting clear goals, understanding the purpose of the team project and the ground rules for decision making, and setting deadlines.
1, 2, 3, 4	**8.LD-Q.4**	Respond to persuasive messages with questions, challenges, or affirmations.
1, 2, 3, 4	**8.LD-V.9**	Monitor text for unknown words or words with novel meanings, using word, sentence, and paragraph clues to determine meaning.
All lessons	**8.IT-E.1**	Compare (and contrast) the central ideas, problems, or situations from readings on a specific topic selected to reflect a range of viewpoints.
1, 2, 3, 4	**8.IT-DP.4**	Evaluate the adequacy of details and facts to achieve a specific purpose.
1, 3, 4, 5	**8.R.1**	Apply steps for obtaining information from a variety of sources, organizing information, documenting sources, and presenting research in individual and group projects.
1, 3, 4	**8.W-E.2**	Write coherent multi-paragraph compositions (including compare-and-contrast essays) that: include a thesis statement, use logical organization, make effective use of detail and rhetorical devices, and include variety in sentence structure and transition sentences to link paragraphs.
5	**8.W-E.5**	Write persuasive (pro/con) essays that: include a well-defined thesis that sets forth a clear and knowledgeable position, theory, or generalization; support arguments with well-articulated evidence, examples, and reasoning, differentiating between evidence and opinion; and arrange details, reasons, and examples effectively, anticipating and answering reader concerns and counterarguments.
1, 3, 4, 5	**8.EL.7**	Spell correctly, including commonly confused words (its/it's, affect/effect) and irregular plurals (e.g., sheep).

National Health Education Standards – Grades 6 – 8: cited from pre-publication document of National Health Education Standards, Pre K-12, American Cancer Society, December 2005 – August 2006		
Lesson	**Standard**	**Performance Indicator**
All lessons	**1.8.1**	Analyze the relationship between healthy behaviors and personal health.
3	**1.8.2**	Describe the interrelationship of emotional, intellectual, physical, and social health in adolescence.
All lessons	**1.8.3**	Analyze how the environment impacts personal health.
3, 5	**1.8.4**	Describe how family history can impact personal health.
2, 3, 4, 5	**1.8.5**	Describe ways to reduce or prevent injuries and other adolescent health problems.
2, 3, 4, 5	**1.8.7**	Describe the benefits and barriers to practicing healthy behaviors.
2, 3, 4, 5	**1.8.8**	Examine the likelihood of injury or illness if engaging in unhealthy behaviors.
2, 3, 4, 5	**1.8.9**	Examine the potential seriousness of injury or illness if engaging in unhealthy behaviors.
2, 3, 5	**2.8.1**	Examine how family influences the health of individuals.
2, 3, 5	**2.8.3**	Describe how peers influence healthy and unhealthy behaviors.
2, 3, 5	**2.8.5**	Analyze how messages from the media influence personal and family health.
1, 2, 3, 5	**2.8.8**	Explain the influence of personal values and beliefs on individual health practices and behaviors.
2, 3, 4, 5	**2.8.9**	Describe how some health risk behaviors can influence the likelihood of engaging in unhealthy behaviors.
2, 3, 5	**2.8.10**	Explain how school and public health policies can influence health promotion and disease prevention.
2, 3, 4, 5	**3.8.1**	Analyze the validity of health information, products, and services.
2, 3, 5	**3.8.4**	Describe situations that may require professional health services.
2, 3, 4, 5	**4.8.1**	Apply effective verbal and nonverbal communication skills to enhance health.
2, 3, 5	**5.8.1**	Identify circumstances that can help or hinder healthy decision-making.
2, 3, 5	**5.8.2**	Determine when health-related situations require the application of a thoughtful decision-making process.
2, 3, 5	**5.8.3**	Distinguish when individual or collaborative decision-making is appropriate.
2, 3, 5	**5.8.5**	Predict the potential short and long-term impact of each alternative on self and others.
2, 3, 5	**5.8.6**	Choose healthy alternatives over unhealthy alternatives when making a decision.
1, 2, 3, 5	**5.8.7**	Analyze the outcomes of a health-related decision.
1, 2, 5	**6.8.1**	Assess personal health practices.
5	**6.8.2**	Develop a goal to adopt, maintain, or improve a personal health practice.
5	**6.8.3**	Apply strategies and skills needed to attain a personal health goal.
2, 3, 5	**6.8.4**	Describe how personal health goals can vary with changing abilities, priorities, and responsibilities.

1, 2, 3, 5	**7.8.1**	Explain the importance of assuming responsibility for personal health behaviors.